

# Transforming the planet: Our vision for the future of environmental science



**Summary for Policymakers**



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# Acknowledgements

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**About the Institution of Environmental Sciences (IES):**

The IES is a professional membership organisation unifying communities of scientists, policymakers, and academics to transform knowledge on environmental science and support the transition to a sustainable society.

Across the full range of environmental disciplines, the IES brings together and champions the voices of science, scientists, and the natural world. As a convening space for interdisciplinary expertise, the IES promotes transformational learning to support our members in their professions and as agents of change.

The IES offers a common home for all those involved in environmental work or action underpinned by science. We are devoted to championing the crucial role of environmental science in ensuring the well-being of humanity now and in the future.

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# Executive Summary

Environmental scientists will play a key role in facilitating the transformation to a sustainable society. Adapting to changing social, economic and environmental contexts will be imperative, to ensure that the workforce is in the best position to provide leadership in developing multifunctional solutions to the interlinked environmental crises of climate change, biodiversity loss and pollution.

The Institution of Environmental Sciences' (IES) year-long Future of ES23 project brought the environmental science community together to outline a pathway for achieving a positive future for people and the planet. The work was informed by extensive engagement with environmental professionals on the key areas shaping the sector and this document outlines these findings.

**The vision is a future where environmental scientists are knowledgeable, skilled, diverse, and trusted. Their role is to help people to solve environmental challenges and co-create a sustainable society where people and nature thrive.**



Climate change, biodiversity loss and environmental pollution are already having myriad impacts on the natural environment, with consequences for the social and economic systems that rely on a healthy environment. The environmental scientists of the future must be able to work in partnership to address challenges holistically. Humanity has reason to be optimistic about the future, as long as it takes the actions necessary to achieve that future.

Transformative change, underpinned by systems thinking principles, is a key part of realising that change. Understanding the leverage points within social and natural systems will be essential to embedding an integrated approach and supporting a transition to a sustainable society. This society will need to be co-created with communities, with environmental scientists providing opportunities for knowledge exchange and outlining evidence-informed options to address challenges.

Sustainability is not possible without inter- and transdisciplinarity. To develop multifunctional solutions to social, economic and environmental challenges, environmental scientists need to work across specialisms and disciplines, reducing the likelihood of 'single factor solutions' with risks of unintended consequences. Tapping into expertise from the social sciences and engineering will be essential for this. Environmental scientists can lead by example in developing interdisciplinary teams, through utilising their existing expertise in working across specialisms to deliver research and applied science.

Effective inter- and transdisciplinary working depends on access to enabling skills, such as communication and strategic thinking. Teams with 'knowledge brokers' and 'boundary spanners' can support collaboration, allowing for genuine knowledge exchange. For environmental scientists to act as agents of change, many will also need technical skills, net zero skills, digital skills and knowledge of systems. To upskill the sector, learning providers and professional bodies need to update curricula and training, develop technical pathways, and expand lifelong learning opportunities.

With updated skills and knowledge, environmental scientists will ensure that technologies are used appropriately to support environmental understanding, analysis, modelling and prediction, limiting the risks which are inherent to technological change. Advancements such as real-time monitoring, remote sensing, Artificial Intelligence (AI) and machine learning, are already disrupting the sector, but have the potential to unlock approaches to environmental improvement.

Technological development is also revolutionising the amount, quality, connectivity, and granularity of environmental data. Increased availability of real-time data allows scientists to measure and predict environmental systems on large scales, but quality and interoperability can be variable. By increasing data sources through the roll out of standards and improved accessibility and transparency, environmental scientists can unlock a greater role of data in decision making. This will allow scientists to measure progress towards targets using integrated assessment approaches, which take account of a combination of data sources and better reflect the systemic nature of environmental issues.

Translating evidence to different audiences will continue to be crucial, so environmental science requires meaningful engagement with decision-makers and the public. The science-policy interface is likely to change significantly, including a greater role for public engagement and public empowerment.

Principles of environmental justice and Equity, Diversity and Inclusion (ED&I) must be embedded throughout environmental work. The complex, interconnected issues facing the environment require collaboration, coordination, and cooperation. Fundamental to tackling these issues and creating a truly sustainable future is the ability to deliver environmental work that transcends governments, cultures, and disciplines, delivering for both people and nature. Targeted interventions will be needed to increase the inclusivity of the sector so that those from diverse backgrounds are inspired and enabled to build careers in environmental science.

Achieving a just transition to a sustainable society requires that environmental work is underpinned by the concept of environmental improvement, as it is essential for securing the benefits of a healthy environment for future generations. Embedding principles of improvement will be a critical role of environmental scientists and this will depend on a profession that is equipped with the skills, knowledge and ways of working to support transformative change.

The profession must act to realise this vision now; due to path dependency, the decisions made now will have a large impact on the future. The IES is committed to a leadership role in shaping environmental science and working with our members and partners to achieve our vision: a future for environmental science that will enable current and future generations to benefit from all that a healthy environment offers and where both humanity and nature flourish.

# Our Vision for the Future of Environmental Sciences

Humanity has everything it needs to create a better future for society and the environment, supported by environmental science and the change that scientists can create within our own community.

Moving away from the business-as-usual model of incremental, atomistic change, action which is faster, more ambitious, and more effective will achieve a much better response to environmental crises. Using transformative change and a strong understanding of systems to facilitate rapid triage of the worst consequences of environmental decline could pave the way to a future where natural systems are repaired, moving towards environmental improvement.

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**This is our vision for the future of environmental science. It is one where environmental scientists are knowledgeable, skilled, diverse, trusted, and engaged in the process of transformation. It is one where people have access to the relevant science to help them solve environmental challenges and co-create a sustainable society where people and nature thrive.**

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Achieving this vision paints a picture of a positive future for both the environment and wider society, in which people and nature mutually thrive.

## Science transforming the planet: what can we hope for if we act now?

In our vision of the future, **environmental science** played a leading role in shaping society's understanding of environmental challenges. Humanity's success in addressing environmental challenges can be attributed to utilising **transformative change** by using the leverage points which were most likely to affect the overall system.

Through interdisciplinary collaboration with social scientists, engineers, and policy makers, environmental scientists were able to work with society to achieve the change needed and supported society in creating a shared vision for the future. At the centre of that shared vision were the principles of **interdisciplinarity, systems thinking, and sustainability**, which was facilitated by carbon and systems literacy across society.

To deliver a systems approach, science used the opportunity of **technological change** to shape the way that society makes decisions, managing the risks of new technology and novel chemicals while appropriately applying Artificial Intelligence, digital landscapes, and advances in monitoring and modelling to support society's approach to change.

Technology made transformative change possible by **consolidating data and evidence** on which interventions would be most likely to succeed and where unintended consequences may arise, informed by post-implementation reviews and real-time monitoring of the effects of policies. As a result, decision makers could take a reflective approach, adapting to failures more quickly than would otherwise have been possible, ensuring timely and effective action to address environmental challenges.

Environmental scientists used enabling **skills** to communicate evidence to the public and facilitate knowledge exchange, ensuring that society had a direct role in shaping the choices we made about what we wanted the future to look like. Through storytelling, strategic planning, and visualisation techniques, environmental scientists were well-placed to work with both policy makers and the public, bringing together research, policy, and professionals to translate complex decisions into actionable choices for the public.

Those skills were rolled out to the environmental workforce across many routes into the profession and through targeted professional development for those already working. By systematically approaching the ways that environmental scientists are educated, the sector was able to simultaneously increase the diversity of the profession by tackling the structural barriers to entering the workforce, bringing a wider range of perspectives into environmental science in the process.

This was a critical step to **rebuilding trust in science** and helping environmental scientists to bring different communities together to support change. People were empowered to make decisions about the future because science was relevant and accessible to them. At the same time, decision makers had the evidence they needed to act and made decisions which were truly informed by that evidence, using it to create the world that science and the public had co-created together.

As scientists worked to **support policy and the public** in making decisions, the growth in the environmental science sector allowed them to continue discovering new information about the natural world while also playing an increasing role in tackling challenges directly, identifying solutions and helping people to make decisions about which to use. At the same time, growing the sector allowed the inclusion of a more diverse workforce, ensuring that environmental science had the breadth of expertise and perspectives needed to tackle challenges.

By **embedding justice** and **environmental improvement** in all decisions, from the project level to high-level decisions about the future we want to see, we ensured that nature and the services it provides were plentiful and accessible to everyone. At the professional level, scientists promoted best practice that took every opportunity to seek environmental enhancement, rather than defaulting to protection or mitigation of harm. Using those case studies, these practices became widespread, ensuring improvement in more than just name.

At the societal level, scientists worked with people to shift their view away from the 'fortress model' that the natural world is separate from the human world. People began to see their role as part of a wider ecosystem, as well as how interconnected they are with nature. As a result, decision makers and communities pursued more holistic approaches to environmental challenges, which helped to secure multiple benefits throughout the transition.

In the end, humanity embraced a sustainable approach to living within planetary boundaries and transformed society into one that exists in partnership with the natural environment, providing a safe and just space for everyone.

Environmental scientists played a key role in achieving this change. The knowledge, skills, diversity, and reliability of the profession was a fundamental lever in ensuring that humanity had the evidence needed to craft the world they wanted to see.

This vision ends with a human society which is happier, optimistic for the future, and flourishing thanks to the benefits springing from an abundant natural world.



# Recommendations: What key actions deliver a better future?

Many actions will be necessary to deliver the best possible future set out in this vision statement. These 10 recommendations represent the most pressing factors in determining whether that world will manifest. These recommendations are aimed at environmental scientists, the environment sector, governments, and all of society.

1. **Environmental scientists** work with social scientists to **build trust and co-create a future vision** for a sustainable society with communities, facilitating knowledge exchange and informing citizens of the evidence and how different approaches can be achieved.
2. **Environmental scientists** retain the objectivity of their science by drawing a line between science and activism, but are **ready to be ‘informed agitators’** on behalf of science when needed.
3. **Environmental scientists** play a critical role in the transition to a sustainable society and the development of evidence-based solutions, enabled by technology. Scientific expertise **ensures that appropriate technologies are applied** to support understanding, data gathering, analysis, modelling and prediction.
4. **Environmental scientists** measure progress towards environmental targets **using ‘integrated assessment approaches’** which utilise a combination of data sources and take account of the systemic nature of environmental issues. Findings from assessments are used to form evidence bases on the effectiveness of interventions.
5. **Environmental scientists** embed environmental justice across all projects to make them sustainable. The environment sector **employs a diverse field of environmental scientists** who champion environmental justice in their work and co-create solutions with communities.
6. **The environment sector** develops training to **support environmental scientists as agents of change**, providing enabling skills, technical skills, digital skills, and systems thinking skills. Competency frameworks are regularly reviewed and updated to reflect the skills mix needed in the sector.
7. **The environment sector** establishes **knowledge networks and communities of practice** to act as forums to support systems thinking and links between disciplines. They focus on providing case studies of practical applications of systems thinking and interdisciplinarity, as well as tools and frameworks to support those approaches.
8. **Governments and policy organisations** recognise the role of **evidence-informed policy design and delivery**, embracing the full range of scientific insights, whether or not they are politically convenient.
9. **Society’s** approach to environmental crises is **integrated at every level**, from global governance to the ways environmental scientists work. Decision makers understand and respond to the climate crisis in the context of biodiversity loss, pollution, and the complex social and natural systems underpinning them.
10. **Society** meets the burden of **continuing environmental improvement** to prevent further environmental decline. No generation leaves the world in a worse state than they received it, recognising that a status quo of environmental decline means that ‘do no harm’ is an insufficient way of preventing damage.



# In conclusion: From our vision to yours

Our vision for the future of environmental science marks the end of one project, but it is also the beginning of the work to make that vision a reality.

Over the coming years, the Institution will continue working with members and partners to prepare the sector to achieve a better future. It will inform the Institution's next organisational strategy in 2024, as well as our approach to developing the skills and competencies of IES members through training, events, and knowledge communities.

Visions of the future are iterative by nature, subject to changing circumstances which revise the details but not the destination. Visions also iterate as they are exposed to more perspectives, which will be important as the IES engages a broad coalition of partners to achieve a better future for people and the planet. In the process of doing so, the IES will hope to realise this vision while helping society create its own.

Throughout the Future of ES23 project, the message has been clear. Humanity has the potential to address environmental challenges, with environmental science playing a fundamental role in shaping solutions and facilitating the transition to a sustainable society.

That future demands that environmental scientists are knowledgeable, skilled, diverse, and trusted, engaging them in the process of transformation towards a sustainable society. It demands that global governments take the situation seriously, embracing the role of evidence and accepting the full range of scientific insights, whether or not they are politically convenient. It demands that science is relevant and accessible to everyone, helping people use evidence to craft the world they want to see.

Humanity has a tremendous influence over the world around it, so people living now have a responsibility to safeguard and enhance the environment for the good of future generations. Only with the expertise of scientists can environmental improvement be consistently realised, so the mission of environmental science and the Institution must be to support people on the path to reimagining and transforming their relationship with the natural world.

Environmental science will be the foundation which sets the world on the journey towards that goal, as scientists and communities embark together on the collective endeavour of **transforming the planet.**



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